

REMARKS

The foregoing amendment cancels claim 12 and 14-16, amends claims 1 and 13 and adds claims 17 and 18. Pending in the application are claims 1-11, 13 and 17-18, of which claims 1, 13, 17 and 18 are independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

Claim 1 is amended to specify that the exhaust gas has been compressed and heated by the compressor.

Claim 13 is amended to include the subject matter of canceled claims 14-16.

New claims 17 and 18 has been added to more fully claim the instant invention and recite subject matter originally found in claims 13-16. *No new matter is added.*

Amendment and cancellation of the claims are not to be construed as an acquiescence to any of the objections/rejections set forth in the instant Office Action, and were done solely to expedite prosecution of the application. Applicants reserve the right to pursue the claims as originally filed, or similar claims, in this or one or more subsequent patent applications.

Claimed Invention

The present invention is directed to a gas supplying apparatus for supplying gas to a fuel cell. In the claimed system and method for supplying a supply gas to a fuel cell, a compressor compresses exhaust gas discharged from the fuel cell through adiabatic compression to thereby *heat* the exhaust gas. The heated exhaust gas from the compressor is then supplied to the heat exchanger, and heat transfers from the exhaust gas to the supply gas. The heated supply gas is supplied to the fuel cell. Specifically, the gas supplying apparatus of the present invention is used to supply a supply gas to the fuel cell by sucking the exhaust gas by a compressor and then performing heat exchange between the supply gas, which is normally at atmospheric temperature, and the exhaust gas, which is heated through the compression of the exhaust gas by the compressor.

Double Patenting Rejection

Applicants respectfully traverse the rejection of claims 1, 2, 8 and 12-16 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending Application No. 09/908,204. It is Applicants' position that there are several differences between the claims of the two applications, and the claims are not obvious variations of each other in view of the cited prior art. For example, independent claims 1 and 12 of the present invention recite a heat exchanger, a feature lacking in the claims of Application No. 09/908,204. Claim 13 of the present invention recites the step of simultaneously introducing supply gas to a heat exchanger and introducing an exhaust gas discharged from a fuel cell into the heat exchanger, a feature also lacking in the claims of Application No. 09/908,204. The claims of Application No. 09/908,204 also recite certain features not found in the claims of the present application. Therefore, because the claims of the present application are different from the claims of Application No. 09/908,204, and not obvious in view of the references, the statutory type double patenting rejection should be withdrawn.

Applicants also traverse the rejection of claims 1-12 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending Application No. 09/801,312 in view of Reiser. There are several differences between the claims of pending Application No. 09/801,312 and claims 1-12 of the present application. Therefore, claims 1-12 would not be obvious over the '312 application in view of Reiser. For example, the '312 reference is directed to a fuel cell system including a water-permeable-type humidifier and an auxiliary humidifier, a combination lacking in the present claims. The '312 claims do not recite a compressor and/or heat exchanger as recited in claims 1-12 of the present application. There is no motivation to use the teachings of Reiser with the teachings of the '312 reference. Furthermore, as described below, the Reiser reference fails to teach or suggest controlling and/or increasing the temperature of an exhaust gas prior to performing heat exchange between an exhaust gas and a supply gas. Therefore, the statutory type double patenting rejection should be withdrawn.

35 U.S.C. §102 Rejection

The Examiner rejects claim 13 under 35 U.S.C. §102 as being anticipated by Voss (U.S. Patent Number 6,106,964). Applicants respectfully submit that amended claim 13, which specifies that the temperature of the exhaust gas is increased by compressing the exhaust gas prior to introducing the exhaust gas into the heat exchanger, is patentable over

the Voss reference.

The Voss reference describes a fuel cell that employs a combined heat and humidity exchanger having a water permeable membrane. Water and heat from an exhaust stream transfer from the exhaust air stream through the membrane and into a supply air stream.

The Voss reference does not teach or suggest controlling the temperature of the exhaust gas used to perform heat exchange with a supply gas, as recited in claims 13. Specifically, the Voss reference does not teach or suggest increasing the temperature of an exhaust gas by compressing the exhaust gas before passing the exhaust gas to a heat exchanger and does not teach or suggest any component capable of compressing an exhaust gas. Rather, the Voss reference, in Figures 1 and 2, clearly illustrates an exhaust gas passing directly from an outlet of the fuel cell to an exhaust chamber of a heat and humidity exchanger, without being compressed or having the temperature of the exhaust gas increased. Therefore, claim 13 is patentable over the Voss reference.

35 U.S.C. §103 Rejections

The Examiner rejects claims 1-12 and 14-16 under 35 U.S.C. §103 as being unpatentable over Voss in view of Reiser (U.S. Patent Number 6,497,971). Applicants respectfully traverse the rejection and submit that the claims are patentable over the cited references. Even in combination, the references fail to anticipate the claimed invention. Furthermore, Applicants respectfully submit that there is no motivation to combine the references to render the claims obvious.

As described above, in the Voss reference, the gas supplied to the fuel cell 100 is heated by the heat in the gas exhausted from the fuel cell 100 by means of a water and heat exchanging-type humidifier 200.

As recognized by the Examiner, Voss does not teach a compressor functioning as a temperature control device located downstream of the fuel cell, which compresses an exhaust gas. The Voss reference also does not teach or suggest controlling or increasing the temperature of an exhaust gas used to perform heat exchange with a supply gas.

The Reiser reference fails to compensate for the deficiencies of the Voss reference. The Reiser reference describes a fuel cell assembly including blowers 17A, 17B downstream

of the fuel cell stack for flowing oxidant through the cathode flow fields of the fuel cell. The blowers are mounted on portions of a manifold for the oxidant gas and are used to push or pull oxidant reactant through a fuel cell assembly. The Reiser reference describes detecting a temperature of the fuel cell assembly and increasing or decreasing the flow rate of oxidizer using the blower when the temperature is below or at, respectively, a selected temperature. The fuel cell described in Reiser may also recycle a selected portion of the oxidant via a recycling channel 73, as shown in Figure 6.

The Reiser reference does not teach or suggest controlling the temperature of an exhaust gas, and clearly does not teach or suggest compressing exhaust gas to increase the exhaust gas temperature. The blowers 17A and 17B draw oxidant gas from the fuel cell, but do not *compress* exhaust air, as recited in independent claim 1. Rather, the Reiser reference merely changes the flow rate of the exhaust air. The Reiser reference also does not teach or suggest controlling and/or increasing the temperature of an exhaust gas prior to performing heat exchange with the supply gas, as the blowers do not affect the temperature of the exhaust gas. According to the Examiner, the blowers of Reiser inherently control the temperature of the oxidizing exhaust gas. However, the Reiser reference does not teach or suggest controlling a temperature of an exhaust gas that is then introduced to a heat exchanger, as recited in claims 1-11, 13, 17 and 18.

The Reiser reference also does not teach or suggest performing heat exchange between a supply gas and an exhaust gas, as recited in claims 1, 13, 17 and 18.

The Reiser also does not teach or suggest controlling a pressure of an exhaust gas introduced into a heat exchanger, as recited in claims 2, 7, and 14-16, since the Reiser reference does not teach or suggest including a heat exchanger in a fuel cell. The Voss reference also does not teach or suggest controlling a pressure of an exhaust gas introduced into a heat exchanger.

Furthermore, neither the Voss reference nor the Reiser reference teaches or suggests controlling a controller depending on a parameter of a supply gas, as recited in claims 3-6 and 10. The Reiser reference only describes altering the flow rate of an exhaust gas using a blower depending on the temperature of the exhaust gas, not a supply gas.

The Reiser reference also does not teach or suggest a heat exchanger comprising a

humidifier, as recited in claim 8.

Furthermore, there is no motivation to combine the references to render the claims obvious, as required when determining that a claim is obvious. In determining whether a case of *prima facie* obviousness ("obvious on its face") exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification. The prior art must provide the motivation to make a change to its own teachings to arrive at the invention under rejection. That is, it is not sufficient that the prior *could be* so modified; instead the prior art must teach or suggest that the prior art *should be* so modified.

The Voss reference does not describe or suggest a motivation for or a benefit to including a compressor in the system described therein. The Reiser reference does not teach or suggest including a heat exchanger in a fuel cell system. The lack of a heat exchanging system would make it difficult, and certainly not obvious, to modify the system described in Voss using the teachings of Reiser. Under U.S. law, even if a combination of the references teaches every element of the claimed invention, without a motivation to combine, a rejection based on a *prima facie* case of obvious is improper. The Examiner has not provided an objective reason to combine the teachings of the references to support his statement that it would have been obvious to combine the Voss reference with the Reiser reference. As is evident from a close reading of the references and a comparison to the pending claims, the instant rejection of claims 1-12 and 14-16 constitutes nothing more than a picking and choosing of the various elements of the claims from a number of references based, not on motivation from the references themselves, but rather based on the teachings of the application. Thus, the instant rejection constitutes an impermissible hindsight reconstruction of the invention.

Information Disclosure Statement

Applicants have filed herewith an Information Disclosure Statement to make U.S. Patent Numbers 5,441,819, 5,543,238, 6,306,532, 5,518,828, 5,928,805, 6,447,939, 5,208,114, 6,394,207 and 6,268,074 of record during the prosecution of the above-referenced patent application. Applicants do not consider the cited references to detract from the patentability of the pending claims, as the cited references do not teach or suggest the claimed invention.

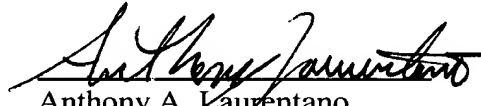
CONCLUSION

For these reasons, Applicants contend that claims 1-11, 13, 17 and 18 are patentable and that the claims are clear and definite. As such, the Examiner's objections and rejections so far as they are based upon 35 U.S.C. §102 and 35 U.S.C. §103 should be reconsidered and withdrawn. Allowance of the pending claims at an early date is solicited.

If, however, the Examiner considers that obstacles to allowance of these claims persist, we invite a telephone call to Applicants' representative.

Respectfully submitted,

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Date: **August 6, 2003**